

Highway/Rail Crossings

Part 8 of the *MUTCD* details the recommendations for appropriate traffic control at railroad grade crossings on public streets and roads. Volumes of traffic on both rail and road facilities, location, terrain, and roadway surface are some of the factors that may affect the type and extent of signs and markings to adequately protect public safety at these crossings.

Highway/rail grade crossing controls can be grouped into two general classes: passive and active. Passive controls include signs, pavement markings, and crossing illumination. Active controls include flashing lights and gates. In this manual, only passive controls will be described in detail.

Signs

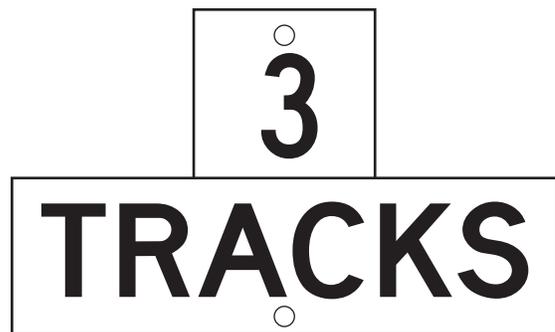
Railroad Crossing Sign (Crossbuck). The railroad crossing sign (R15-1), commonly referred to as a “crossbuck,” is a regulatory device composed of white reflectorized sheeting with “Railroad Crossing” in black lettering. The accompanying supplemental sign (R15-2) can be used to denote the number of tracks at the crossing, if there are two or more. Placement and maintenance of these signs are normally a responsibility of the railroad company, but transportation agencies may want to advise the company of any deteriorating sign conditions.

Where physically possible and when visible to approaching traffic, the Railroad Crossing sign should be installed on the right side of the approach roadway to the crossing. Where engineering study indicates restricted approach sight distance or unfavorable road geometry, crossbuck signs can be mounted back-to-back or otherwise located, so that two faces are displayed to that approach.

For the future, Section 8B.02 requires that white retroreflective material, minimum of 2 inches wide, be placed along the back of both blades of R15-1 signs and on the front and back of support posts.



R15-1



R15-2

Railroad Advance Warning Signs. A Railroad Advance Warning sign (W10-1) should be used on each approach roadway to grade crossings, except in the following situations:

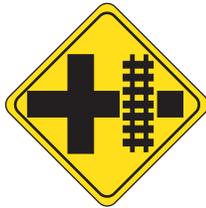
- on low-volume, low-speed roadways crossing minor spurs or other tracks that are infrequently used or flagged by train crews
- in business districts where active highway/rail crossing traffic control devices are in use



W10-1

Be sure to place these signs in accordance with Chapter 2A and Table 2C-4 in Section 2C.05 of the *MUTCD*. In residential or business locations where very low speeds are prevalent, minimum placement distances of 100 feet from the crossing may be appropriate.

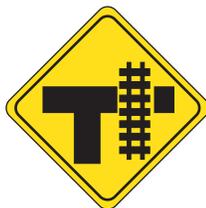
Railroad Advance Warning signs (*W10-2*, *W10-3*, and *W10-4*) are intended for approach roadways that parallel the railroad to warn turning drivers that they will encounter a highway/rail grade crossing soon after making the turn. Placement location for these signs, described in Table 2C-4 in the *MUTCD*, is measured from the roadway intersection. Examples of these warning signs are shown below.



W10-2



W10-3



W10-4

Stop and Yield Signs. Stop (R1-1) or Yield (R1-2) signs at highway/rail grade crossings may be used at the discretion of the road authority and should be limited to those locations where warranted by engineering study. According to Section 8B.07 of the *MUTCD*, factors for consideration may include

- substantial train traffic (two or more trains per day)
- no automatic signal
- low-volume roadway traffic
- limited visibility of oncoming trains by approaching road vehicles
- character and significance of crash history,
- an interim measure until active traffic control devices are installed



R1-1



R1-2

When used, Stop or Yield signs may be installed on the crossbuck post or located on a separate support at a point where vehicles are to stop and with a clear view down the tracks. In accordance with *MUTCD* Chapters 2B and 2C, as well as “Stop and Yield Signs” (C15) in this manual, Stop Ahead (W3-1 or W3-1a) or Yield Ahead (W3-2 or W3-2a) may also be required.



W3-1



W3-1a



W3-2



W3-2a

Many other signs are described in Part 8 of the *MUTCD* for use in appropriate situations and the user should refer to this resource for additional information and warrants for use. These signs include the following:

- Exempt (R15-3)
- Do Not Stop on Tracks (R8-8)
- Tracks out of Service (R8-9)
- Low Ground Clearance Sign (W10-5)
- Trains May Exceed X mph(W10-8)
- No Train Horn (W10-9)

Note that many of these signs are regulatory and require official action for installation and enforcement.



R15-3



R8-8



R8-9



W10-5



W10-8



W10-9

Pavement Markings for Grade Crossings

On paved roadway approaches, pavement markings in advance of a grade crossing shall consist of an X, the letters RR, no passing markings and signs if on a two-lane road, and appropriate transverse lines. All markings shall be retro-reflectORIZED white, except for the no passing zone line, which shall be retroreflectORIZED yellow. Except as noted below, be sure to place markings in each lane of all paved approaches to crossings where signals or automatic gates are located or where the prevailing speed is 40 mph or greater.

- Place pavement markings at crossings where continuous rails are in place, regardless of whether the railroad is operating.
- Markings need not be placed if any portion of the rails in the roadway have been removed or paved over, if any portion of the rails approaching the crossing has been removed, or if Exempt signs are in place.
- Consider train “dynamic envelope” when locating stop bars.
- At minor crossings or in urban areas, pavement markings may be omitted if an engineering study indicates that other traffic control devices installed provide suitable warning.
- No Passing Zone signs (W14-3) should be installed in accordance with *MUTCD* Chapter 2C and “No Passing Zones” (H2) in this manual when no passing lines are placed.



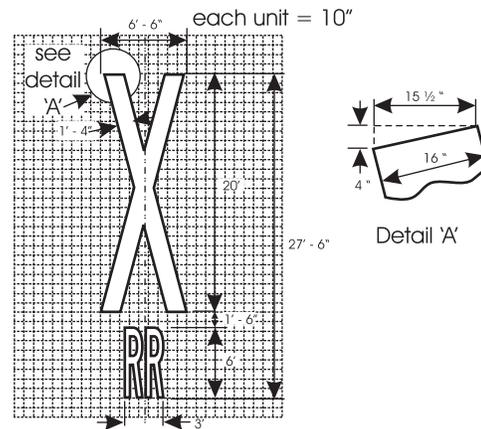
W14-3

- Advisory Speed plate (W13-1). This plate may also be appropriate when indicated by an engineering study.

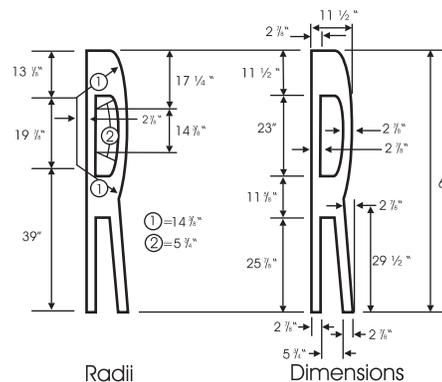


W13-1

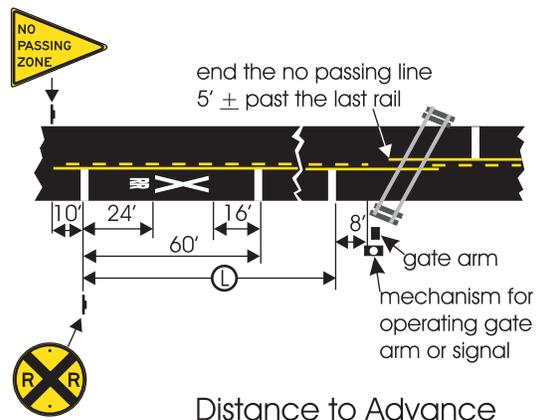
Design and layout of signs and pavement markings at highway/railroad grade crossings are illustrated in the following diagrams.



Railroad crossing symbol (narrow)



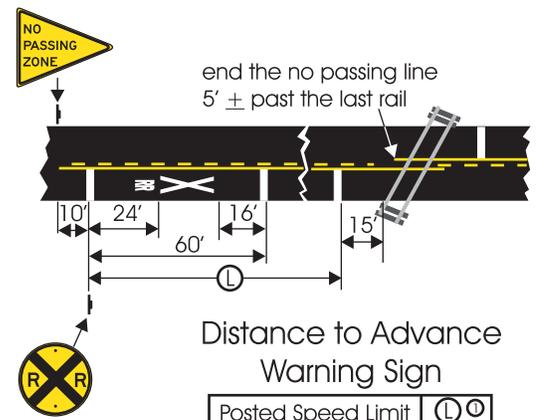
“R” crossing symbol



Distance to Advance Warning Sign

Posted Speed Limit	(L) (O)
30 mph	325'
35 mph	400'
40 mph	475'
45 mph	550'
50 mph	625'
55 mph	700'

Standard pavement markings for a grade crossing with gates or signals



Distance to Advance Warning Sign

Posted Speed Limit	(L) (O)
30 mph	325'
35 mph	400'
40 mph	475'
45 mph	550'
50 mph	625'
55 mph	700'

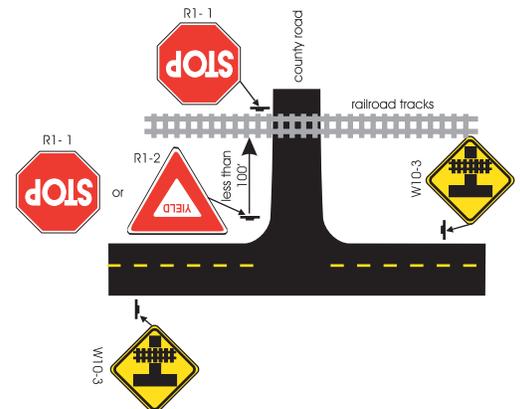
Standard pavement markings for a grade crossing without gates or signals

All transverse markings shall be 24 inches wide.

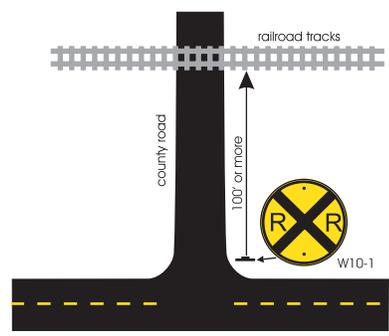
On multilane roads, the transverse markings shall extend across all approach lanes, and individual RR and X symbols shall be used in each approach.

① Minimum distance may be increased to fit conditions at individual crossings and interpolated for speeds not shown.

Refer to Section 8B.16 of the *MUTCD* for more details on pavement markings.



Restricted road sight distance



Advance stop and warning for parallel railroad grade crossing

Although both total incidents and casualties at railroad/highway crossings have declined nationally in recent years, some jurisdictions continue to experience signal and crossing violations by drivers. Several innovations have been developed and marketed recently to address this behavior.

A majority of new safety devices and technologies involve physical barriers that prevent or inhibit vehicles from driving around down crossing arms. These devices typically include median barriers consisting of mountable, prefabricated islands with retroreflectorized yellow and black paddle-type delineators or tubular markers mounted thereon. Other effective devices include four quadrant gates and other proprietary systems. For detailed description of four-quadrant gates, see Section 8D.05 of the *MUTCD*.

These innovations may be considered in specific situations where positive barriers are warranted to enhance public safety.

Additional Information and Upgrading Programs

The Iowa Department of Transportation administers a program for upgrading of traffic control at railroad/highway grade crossings with funding through the Federal Highway Administration, entitled Federal-Aid Section 130 Railroad/Highway Safety Program.

Using a hazard formula as described in Chapter 812 of the Iowa Administrative Code and an Exposure Index as developed by the Iowa DOT, qualifying crossing locations can receive funding for needed upgrades of existing traffic control. More information is available in Iowa DOT PPM 500.09.